Arcade Game using Kinect on Motion Gesture

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Abstract: Pong is one of the earliest arcade video games. It is a table tennis sports game featuring simple two-dimensional graphics. The game was originally manufactured by Atari which released it in 1972. Allan Alcorn created Pong as a training exercise assigned to him by Atari co-founder Nolan Bushnell. The purpose of this article references is to revitalize an arcade game that had been lost since the new era. This is because that new generation kids more focus on the online game rather than the arcade game, just stayed at home playing game more than 5 h on computer or smartphone. For the purpose, this project is to develop an arcade game using new technologies that is motion gesture and Kinect.

INTRODUCTION

An arcade game or coin-op is a coin-operated entertainment machine typically installed in public businesses such as restaurants, bars and amusement arcades. Most arcade games are video games, pinball machines, electro-mechanical games, redemption games or merchandisers. While exact dates are debated, the golden age of arcade video games is usually defined as a period beginning sometime in the late 1970s and ending sometime in the mid-1980s. So, by developing an arcade game, we want to reintroduce back arcade game by interactive projection mapping using kinect. This project will make more fun or feeling back for the generation that had been played arcade game. On projection mapping. Furthermore, by using Kinect our audience will move their body to play that game, not just stand or sit in one place.

Background of the study: To reintroduce back arcade game that had been gone by the new generation. In this new generation or new era, many people out there such as teenagers, kids or adult more focus playing a game on smartphone or computer rather than playing an arcade game because of graphics and easy to play. So, this will be a lack of awareness on healthy on their physical when playing that game more than arcade game.

The scope of this project will be focusing on developing an interactive arcade game using Kinect on Motion gesture. So, this game will get your more movement physical for your body and health. This game will have a multiplayer maximum of up to 2 players[1].

In this study, a student is required to developed arcade game using different method by using Unity as platform on new device that is Kinect and motion gesture. Arcade Game: Defining exactly what a computer arcade game is can be a difficult thing to do these days, especially when you consider all of the technological advances that have been made in the gaming industry over the years[2].

An arcade game can be many things and the arcade genre is simply too broad to define with one sweeping

statement. You see, arcade games can encompass everything from games with mindless and gratuitous violence to games that require intricate problem-solving techniques. To further cloud the issue, the action in an arcade game can take place on a single screen or over multiple levels. These levels can be static or completely dynamic with scrolling occurring in all four directions.. To make the concept of the arcade game somewhat easier to comprehend, I've identified five arcade game sub-genres that run the gamut of the arcade game spectrum.

Maze/chase games are also unique among arcade games in that they don't usually require very elaborate or sophisticated graphics and animation. This makes this game category a perennial favorite with game developers of all levels.

Kinect: An advances in 3D depth cameras such as Microsoft Kinect sensors (www.xbox. com/en-US/Kinect) have created many opportunities for multimedia computing. Kinect was built to revolutionize the way people play games and how they experience entertainment. With Kinect, people are able to interact with the games with their body in a natural way. The key enabling technology is human body language understanding; the computer must first understand what a user is doing before it can respond. This has always been an active research field in computer vision but it has proven formidably difficult with video cameras. The Kinect sensor lets the computer directly sense the third dimension (depth) of the players and the environment, making the task much easier. It also understands when users talk, knows who they are when they walk up to and can interpret their movements and translate them into a format that developers can use to build new experiences [3].

Kinect sensor: The kinect sensor incorporates several advanced sensing hardware. Most notably, it contains a depth sensor, a color camera and a four-microphone array that provide full-body 3D motion capture, facial recognition and voice recognition capabilities (Fig. 1). A detailed report of the components in the Kinect sensor is available at (www.waybeta. com/news/58230/Microsoft-Kinect-somatosensory-gamedevice-full-disassembly-report-_Microsoft-Xbox). This study focuses on the visual aspect of the Kinect sensor[4].

Figure 1 and 2 shows the arrangement of the Infrared (IR) projector, the color camera and the IR camera. The depth sensor consists of the IR projector combined with the IR camera which is a monochrome Complementary Metal Oxide Semiconductor (CMOS) sensor. The depth-sensing technology is licensed from the Israel Company Prime Sense (www.primesense. com). Although, the exact
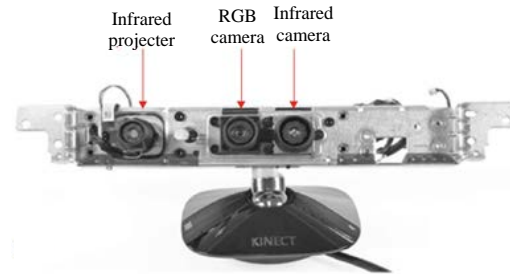

Fig. 1: Kinect sensor

Fig. 2: Kinect device

technology is not disclosed, it is based on the structured light principle. The IR projector is an IR laser that passes through a diffraction grating and turns into a set of IR dots.

There are always some limitations when it comes to develop arcade game using this Kinect device because platform that use and version software Kinect. We lack of source to make references on coding and others.

Motion gesture: Motion meaning that the action or process of moving or being moved. The gesture also meaning a movement of part of the body, especially a hand or the head to express an idea. Furthermore, Motion Gesture means that a topic in computer science and language technology with the goal of interpreting human gestures. Also, the gesture can simplify from body motion but commonly originate directly from face or hand. First important issues that focus in the field include emotion recognition from face and hand gesture recognition. User can use simple gesture to interact with devices without touching on the screen. Many approaches have been made using sensor, cameras and computer vision to interpret sign language. However, the identification and recognition of posture and human behaviors are also subject gesture recognition techniques. Gesture recognition can be seen as a way for a computer to understand human body language. Using the concept of gesture recognition, it is possible to point finger at this point will move accordingly. This could make conventional input on devices such as event redundant.
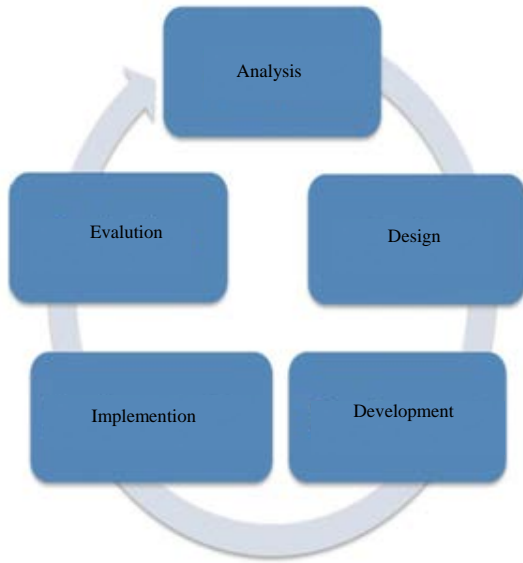
Fig. 3: Addie model

Fig. 4: Flowchart

MATERIALS AND METHODS

Introduction: The ADDIE Model is the generic process tradi- tionally used by instructional designers and training developers. The five phases analysis, design, development, implementation and evaluation, represent a dynamic, flexible guideline for building effective training and performance support tools.

While perhaps the most common design model, there are a number of weaknesses to the ADDIE Model have led to a number of spin-offs or variations. It is an Instructional Systems Design (ISD) Model. Most of the current instructional design models are spin-offs or variations of the ADDIE Model; other models include the Dick and Carey and Kemp ISD Models. One commonly accepted improvement to this model is the use of rapid prototyping. This is the idea of receiving continual or formative feedback while instructional materials are being created. This model attempts to save time and money by catching problems while they are still easy to fix (Fig. 3).

Phase 2 (design): On this phase, the developer will start to decide the design that is suitable for the games to be more interesting. There will be a few designs available at the first stage, developers need to organize the content to show the idea on how to present to the user about this game application. This arcade game using a projector in a dark room. The projector will combine or together with Kinect Xbox One for the play that game. Another part that the designer needs to be concerned about is the content of the interactive application multimedia elements such as text, graphics, animations and video[5].
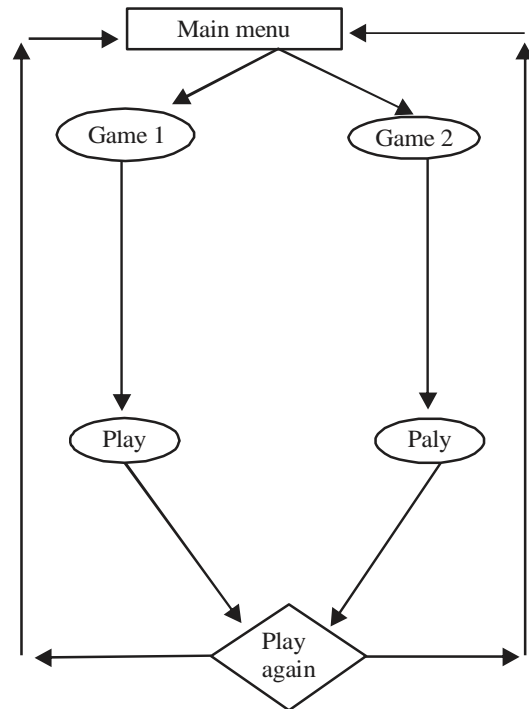
RESULTS AND DISCUSSION

Phase 1 (analysis): On this phase, the developer will start with analysis other similar application and take it as our references but also identify the audience. The developer has to identify the type of game existing, identify delivery options and also identify the timeline for project completion. Attraction interface and the friendly user will gain more user to play this application. The analysis has been made through the questionnaire. The question was distributed to the public to gather information regarding the project title and objective. The questionnaire has 10 questions in total (Fig. 4 and 5).

Phase 3 (development): The development stage starts the production and testing the methodology being used in the project. In this stage, designers make use of the data collected from the two previous stages and use this information to create an application. By using suitable software now the application can be created. The type of software that will be used to develop the application:

Phase 4 (implementation): The implementation stage reflects the continuous modification of the program to make sure efficiency and positive results are obtained. It is about transforming the plan into actionto discover any needs and errors while testing with a prototype product tested to the target audience. It is to make sure that the user understands the product and achieve the out- comes, objective and purpose. There are two types of testing which.

Fig. 5: Software that use for developing game

Fig. 6: Screen shot from game menu

Analysis: The objective and purpose must achieve the goaland needs. How well the achievement of the user for thatarcade game.

Design: The design must fulfil the requirement needed. The content must be suitable for the theme and planning. The project duration must be complete by following the schedule.

Development: The developer must follow the task that is already given. Planning and designing must fulfil the

Fig. 7: Screen shot from game menu

needs of the project. Make sure the prototype has completed before going to the next phase which is the implementation phase.

Development stage: This chapter will explain more detail about the development of the game. On these stages will focus more on the interface, information, navigation, software and testing the game, it will also cover the implementation phases which is Beta testing. In these stages, the developer will focus on the interface design. This stage will take time a bit longer and a lot of changes, to get the best design for the outcome and make the game less fault. In order to develop the game, the developer uses Adobe Photoshop and Adobe Illustrator to create the item or menu (Fig. 6).

Images: All the content such as images developer are using internet vector image, bitmap image and some of them developer created by himself using Adobe Illustrator and Adobe Photo-shop (Fig. 7).

Typography: Selection of typography is one of the important parts to create an application. The font must be clear and easy to read the user. In this game, the font that has been used by the developer is type font Arial for the button, Times New Roman for the score and arcade classic for title game. The developer using only 3 types of fonts to make it less crowded and to maintain the exclusivity of the game. Using font Arial font Family for text or title on this game.

CONCLUSION

This is because that new generation kids more focus on the online game rather than the arcade game, just stayed at home playing game >5 h on computer or smartphone. For the purpose, this project is to develop an arcade game using new technologies that is motion gesture and Kinect.

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